Fisheries Projects List

Ocean Protection Council
2005-2008

FISHERIES MANAGEMENT AND LOCAL SOLUTIONS

Morro Bay Ecosystem-based Management Program

$500,000

Objectives:

Funds were granted to California Polytechnic State University to create a coordinated ecosystem-based management (EBM) approach in the Morro Bay region. This project was created to (1) develop and monitor relevant physical/chemical, biological, and socioeconomic indicators across the ecosystem and to determine how the various components are interconnected and how they affect one another; (2) establish a clear understanding of the institutional linkages within the ecosystem and to build and reorganize the "institutional ecosystem" where needed; (3) provide land managers and stakeholders with improved ecological and sociological data for shared deliberation and decision making on an ecosystem-wide basis for maximum impact and cost effectiveness; and (4) develop a model for EBM that can be utilized in other areas of California, the nation, and the world.

Status:

The San Luis Obispo Science and Ecosystem Alliance (SLOSEA) has made tremendous strides in the last year and a half to establish a functioning ecosystem-based management program in the Morro Bay ecosystem, which includes the watershed, the bay and estuary, and the coastal ocean. They have a built an integrated ecosystem group, the SLOSEA Advisory Committee, which consists of resource managers from state and federal agencies with jurisdictional authority in the ecosystem, representatives from local municipalities, an team of scientists studying the ecological dynamics of the system, and representation and participation of the stakeholder community. The SLOSEA Advisory Committee has met quarterly and has already addressed recommendations on the transport of exotic (invasive) species and reviewed current regulations and made recommendations regarding invertebrate take in the intertidal ecosystem.

San Diego Sea Urchin Fishery Project: A Model for Community Involvement in Science-based Management and Value-added Marketing

$114,000

Objectives:

The San Diego Sea Urchin Fishery Project aims to move the fishery toward long-term conservation and sustainability. Using collaborative research conducted by fishery scientists and the fishing community, the project is transforming the sea urchin fishery in the San Diego area from a data-poor status to one based on good fishery-dependent and independent scientific data and models. Further, the project involves conducting experiments on product enhancement, distribution, and marketing to improve the local sea urchin market so that it that benefits fishermen and the consumer at the local level. These efforts are required for developing responsible harvesting practices, collecting and distributing a high value product, and perpetuating local-level stewardship of the sea urchin fishery.

Status:
The San Diego Watermens' Association and its academic collaborators have completed a local urchin stock assessment which has been peer reviewed by an independent team of fishery experts. They are now working with other stakeholders to develop a mutually agreeable management plan for the fishery. Concurrently, the Association and its colleagues have been experimenting with various harvesting, storing, and marketing techniques for live urchin (uni) to improve business opportunities for this high value product. The Association is now summarizing its finding and methodologies and working with a financial consultant to develop a conceptual business plan for the local fishery.

Transitioning San Luis Obispo County Harbors and Commercial Fisheries to a Sustainable Future
$30,000
Objectives:
OPC funds were granted to the City of Morro Bay to 1) prepare a business plan and 2) build and conduct sea trials of innovative low impact fishing gear, i.e. hook and line and trap, to support the commercial fishing industry and revitalize the harbors of the Morro Bay and Port San Luis.

Status:
The business plan was completed in January 2008 and is available from OPC/SCC staff. The sea trials on the low impact fishing gear were a huge success. The Nature Conservancy intends to continue purchasing fishing permits and integrating low impact fishing gear techniques.

California Fisheries Fund
$2,000,000
Objectives:
The California Fisheries Fund concept was developed by Environmental Defense (ED) in response to the lack of capital available for financing improvements in fishery management, processing, and marketing that could enhance conservation, profitability, and long-term viability of fishing communities. The Fund would offer loans to California fishing communities, groups, associations, and businesses to assist them with a transition to more environmentally and economically sustainable fishing practices and governance, where conventional investment capital or loans from traditional financial institutions are not available. Examples of potential projects that could be supported by the Fund include those that: promote the transition to gear types that have less impact on bottom habitats and reduced bycatch rates; reduce fishing capacity in overcapitalized fisheries; support planning and implementation for management reforms for a particular fishery; improve marketing for sustainable seafood products or create sustainable seafood products that qualify for certification; or support fisheries-supporting infrastructure.

Status:
As an initial step, Shorebank International, working with ED, developed a business plan for the fund. ED has secured at least an additional $2 million in capitol for the fund, which was a requirement o received the OPC grant. ED has also begun to create the advisory committees that will oversee the projects and funding decisions made by the Fund in the future. The Fund will likely begin making investments in the summer/fall of 2008.

San Francisco Fisherman's Wharf Sustainable Seafood Market
$65,468
Objectives:
This project supported Ecotrust to work with the Crab Boat Owners Association (CBOA) to examine the feasibility of developing a fishermen's co-operative that would operate its own buying station, wholesale, and retail space onsite at Fisherman's Wharf in San Francisco—selling sustainable, locally caught seafood directly to consumers, retailers, and restaurants. The initial phase of the project will result in a feasibility study, examining the size of the market for local and sustainable seafood, the business environment, company strategy, financial viability and planning, implementation, risk assessment and mitigation strategy. For the second phase of the project, Ecotrust will develop a more detailed business plan and will support the drafting of architectural drawing of the site.

Status:
The first stage of the project is complete and Ecotrust has found that it is possible for the Fishermen's Wharf area to sustain such a market. They are currently conducting the second stage of the project where they are drafting a more complete business plan. Furthermore, Ecotrust is continuing to work with CBOA, prospective investors, and other partners on forming the co-op and business structure. In addition, Ecotrust will be planning for a capital campaign and construction phase.

Moss Landing Sustainable Fishing Feasibility Study
$50,000
Objectives:
Moss Landing is the largest commercial fishing port in central California. A significant portion of the port's fish landings are coastal pelagic species "wetfish", which includes sardines, squid, mackerel, and anchovy. Over the past few years, a combination of these fisheries' low value/high volume business model and the anticipated closure of three of four offloading facilities in the harbor, has threatened the viability of the port. In December 2006, the Moss Landing Marine Laboratories (MLML) acquired 1.5 acres of property in Moss Landing Harbor that currently houses one of the harbor's remaining offloading facilities. MLML proposed forging a public-private partnership to develop a multi-use marine operations facility that would preserve the offloading facility, while enhancing education and research of the wetfish fisheries. This project will examine the feasibility of constructing a multi-use facility and provide recommendations for promoting the economic, environmental, and social viability of the coastal pelagic fisheries. MLML is partnering with the graduate business schools of the nearby Monterey Institute of International Studies and Navy Postgraduate School facility to evaluate the feasibility of this business model.

Status:
MLML and its partners assessed the existing patterns and trends of the wetfish fishery and offloading facility at Moss Landing Harbor. They evaluated fishery business models used in other regions of the world and developed initial market recommendations for improving the value and market for coastal pelagic species. The partners are now further developing these recommendations, as well as outlining an appropriate public-private management model for the

multi-use facility including recommendations for dockside services necessary for supporting a sustainable wetfish fishery. The feasibility report will be available by March 2008.

DATA MANAGEMENT

Statewide MPA Monitoring Enterprise

$2,000,000

Objectives:

The Marine Protected Areas Monitoring Enterprise (MPAME) works with California and federal agencies, researchers, stakeholders, and the public to develop and refine sustainable, innovative, and effective monitoring approaches, to manage, analyze, and share monitoring data, and develop and deliver monitoring information products on Marine Protected Areas (MPAs). The MPAME places a top priority on the development of systems to collect, analyze, and deliver monitoring information that is most directly and immediately applicable to adaptive management of California's MPAs, but secondarily benefits other resource management programs.

Status:

Dr. Cheri Recchia was hired by the Ocean Science Trust to lead this effort. She has made excellent progress in developing partnerships—she has worked closely with the Dept of Fish and Game and the MLPA Initiative to identify the top priorities for the Monitoring Enterprise. Top priorities include developing an effective and efficient monitoring approach for the North Central Coast, as well as strategizing about how best to monitor the statewide MPA network as a whole, once it's completed. The Monitoring Enterprise is currently hiring a marine ecologist and an information manager to carry out this work.

Commercial Fishery Logbook Data Management (OPC-DFG Workplan)

$450,000

Objectives:

The purpose of this project is to create a comprehensive commercial fisheries catch logbook data management system for DFG. The end goal is to create a coordinated database system for 16 different logbooks into which both old and new fisheries catch and effort data can be input. These electronic databases will allow DFG to better report commercial logbook data so that it can be more efficient incorporated into fishery management decisions.

Status:

In the first phase of this project, programmers developed an electronic logbook for the lobster commercial fishery in California as a pilot. This database is now ready to accept lobster log data from 1 and 3 day trip reports as well as previously entered lobster log data in older formats. In the second phase of this project, programmers will develop electronic databases for 15 additional fisheries. Tasks within this phase will include filling these databases with logbook data that already exist electronically but may be in outdated electronic formats and inputting and checking logbook data that only exist on paper logs submitted by fishers. For the final product, programmers will work to develop electronic versions of the logbooks so that fishers can submit their logs to the state in electronic format on the web.

RESEARCH AND MONITORING

Channel Islands Marine Protected Areas Monitoring Program-ROV Survey Project

$765,000

Objectives:

The Nature Conservancy (TNC) received a grant to purchase a new remotely operated vehicle (ROV) system that will be the primary survey unit for the Channels Islands deepwater ROV monitoring of marine protected areas (MPAs). TNC has subcontracted with Marine Applied Research and Exploration (MARE) to help procure and maintain the ROV system. TNC has committed to raise additional private funds to fill gaps in operational costs for three years of the Channel Islands surveys.

Status:

The new ROV system is currently being fabricated by Deep Ocean Engineering of Alameda, CA and will be ready for sea trials and deployment in mid-May 2008. In late June, the new TNC ROV will be calibrated against DFG's existing 12 year old ROV. If the calibration goes smoothly, the new ROV will be used to monitor all sites within the Channel Islands by mid September 2008.

Deep-Water ROV Surveys in the Channel Islands (OPC-DFG Workplan)

$660,000

Objectives:

This project is part of a cooperative partnership between Marine Applied Research and Exploration (MARE), DFG, the Channel Islands National Marine Sanctuary, the National Oceanographic and Atmospheric Administration and The Nature Conservancy to implement a deepwater monitoring program. In 2003-2004, these groups undertook exploratory ROV surveys at 18 potential sites identified in the Channel Islands Marine Protected Area (CIMPA) monitoring plan. Of those 18 sites, DFG selected 10 priority sites to be monitored and assessed over time—MARE has undertaken biological and habitat ROV monitoring at these sites for the past four years. This grant allows MARE to continue this monitoring through the end of 2008.

Status:

The first year of monitoring is complete, and MARE and DFG staffs are currently post-processing the results. The annual CIMPA report should be available by June 2008. There is now 3 years of quantitative data at 4 sites, and 2 years of data at the other 6 sites. The second year of monitoring funded by this grant will begin in June 2008. In late June, a new ROV will be calibrated against the existing 12 year old ROV. The calibration cruise will be performed at several of the existing Channel Islands sites. The goal is to perform ROV monitoring surveys all 10 sites by mid-September 2008 using the new ROV. The post processing and comparison of the resulting data and trends will follow immediately and will be provided in the 2008 CIMPA annual report due at the end of June 2009.

California Derelict Fishing Gear Removal Pilot Project

$300,000

Objectives:

The California Derelict Fishing Gear Removal Pilot Project (Pilot Project) was conducted by the SeaDoc Society, a marine ecosystem health program of the UC Davis Wildlife Health Center, from July 1, 2005 to December 31, 2006. The purpose of the pilot project was to better determine the extent of the problem that derelict fishing gear poses in California, and if warranted, develop and test methodologies for derelict fishing gear removal. Field operations in the pilot phase were limited to nearshore waters (less than 100ft water depth) and five select coastal areas: Humboldt County coast from Trinidad Head to the mouth of Humboldt Bay; Monterey Bay from Moss Landing to Point Lobos; San Luis Obispo County from Point Estero to Point Buchon; Santa Barbara and Ventura Counties (Channel Islands National Marine Sanctuary); and Los Angeles County (Santa Catalina Island).

Status:
The pilot project has concluded. During the study time, there were thirty days of derelict fishing gear removal: 19,040 lbs of derelict gear was removed from around Santa Rosa, Santa Cruz, Anacapa and Santa Cruz Islands. The majority were derelict lobster traps (intact traps and remnants), also removed was a 4,000 lb purse seine net off Santa Rosa Island. A large number of intact traps were repatriated to fishermen.

Reef Check California Volunteer Diving Monitoring
$243,500
Objectives:
Reef Check California (RCCA) is expanding its network of volunteer scuba divers certified to collect nearshore subtidal data statewide that can be used by resource managers to inform marine management decisions. This project will support RCCA's training, communication and volunteer dive monitoring activities in Southern California and will enable the design and implementation of RCCA's interactive web-based database for the dissemination of statewide data to all interested parties.

Status:
In 2007, Reef Check trained, certified, and coordinated 183 volunteer scuba divers who collected data at 48 sites, 59 surveys, 2,772 transects in 3 regions from San Diego to Mendocino. To date RCCA certified divers have logged 27,546 fishes, 36,783 invertebrates, and 16,070 seaweeds that are part of the RCCA indicator species list. This list was developed in close coordination with the RCCA Scientific Advisory Team which included leading academic researchers and key personnel from the California Department of Fish and Game. RCCA divers have also collected important size frequency data on all fish and economical important invertebrates such as abalone and urchins.

Reef Check and DFG signed a Memorandum of Understanding for the statewide community-based subtidal monitoring program this year. RCCA will be finalizing a new online database and interface design to enable resource managers to access raw data. The goals for the next two years include strengthening the nearly 200-strong diver network, retaining active divers, developing additional partnerships with research institutions and meeting the goal of 60 sites statewide.

Channel Islands SCUBA Survey (OPC-DFG Workplan)
$581,855 ($371,187 to UCSB; $210,668 to NPS)
Objectives:
This project supports SCUBA surveys that assess fish and invertebrate densities, fish biomass, habitat characteristics, and species compositions and distributions within the Channel Islands marine reserves. These surveys are being conducted by the National Park Service (NPS), who is using several methods to enumerate the density of macro-invertebrates, kelps, and substrate characteristics, and researchers at the University of California Santa Barbara (UCSB), who are focusing on fish surveys. Both of these efforts are consistent with Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO)/Cooperative Research and Assessment of Nearshore Ecosystems (CRANE) protocols and are filling gaps in current monitoring efforts. This project also continues a study designed to detect gradients of abundance in and around MPAs into a 4th year.

Status:
The first year of monitoring has been completed; all proposed sites were completed in summer/fall 2007. The data from these surveys are currently being checked and entered into the PISCO database. These results are already being used in the Channel Islands 5-year review analysis process. The researchers are currently making plans for the 2008 field season and anticipate that all sites will be completed.

Central Coast Marine Protected Area Monitoring (OPC-DFG Workplan)
$2,275,000
Objectives:
The Central Coast MPA Baseline Data Collection Project focuses on acquiring baseline data for the newly designated central coast MPAs—data which can be used in the future for adaptive management and to assess compliance with the goals and objectives of the Marine Life Protection Act (MLPA). This project is a collaborative effort between the State Coastal Conservancy, Ocean Protection Council, DFG, and California Sea Grant Program. The project consists of several individual research efforts which will be combined to establish a baseline of existing resources throughout the central coast prior to the implementation of the new MPAs. The five efforts which comprise the project include: surveys of rocky intertidal habitats, diver surveys of kelp forests, manned submersible surveys of deep-water habitats, socioeconomic studies of both consumptive and non-consumptive users, and a collaborative research project with recreational fishermen.

Status:
The survey work for these projects was completed in summer and fall 2007. All the researchers will submit their data to the MPA Monitoring Enterprise and DFG in the spring of 2008.

North Central Coast Socioeconomic Data Collection (OPC-DFG Workplan)
$200,000
Objectives:
As the MLPA process progresses, it has been essential to examine impacts to commercial fishing operations as a result of MPA implementation. Ecotrust was previously contracted to compile expert knowledge from fishermen to create a comprehensive picture of commercial fishing use

patterns along the central California coast. This project builds upon that experience and generates similar data for the North Central Coastal (NCC) MLPA study region. Data was collected through interviews with fishermen and represents participants' fishing grounds and other non-spatial attributes, including demographics, basic operations (gear types, crew size/composition, operating costs and revenues), and other descriptive characteristics.

Status:
A total 174 commercial fisherman were interviewed during the summer of 2007. Data from these interviews were analyzed by Ecotrust staff, and results were presented and used by the NCC Regional Stakeholder Group (RSG) as they designed their draft MPA network proposals. Additionally, Ecotrust has used these datasets in combination with basic operation cost estimates to determine the estimated maximum economic impact to each commercial fishery (fishery per port) for each draft MPA network that has been proposed to date the RSG. Ecotrust will continue to assess and report the maximum economic impacts for each iteration of the MPA network design process. The RSG will continue to use this information along with other Science Advisory Team (SAT) evaluations to refine their MPA proposals until a preferred package is completed and forwarded to DFG and the Fish and Game Commission for review.

Fish Trapping Surveys (OPC-DFG Workplan)
$407,855
Objectives:
As part of its joint workplan with DFG, the OPC provided funds to the University of California Santa Barbara (UCSB) to gather information on several invertebrate and fin fish species in and around the Channel Island marine reserves. The surveys are being conducted using commercial traps, and the researchers are collaborating with commercial fishermen to set the traps, collect data, and promote academic-fishermen partnerships. The surveys are specifically targeted to evaluate whether the marine reserves have influenced the population structure of California spiny lobster, cabezon, California sheephead, grass rockfish, and other fishes targeted by the live-fish fishery within, adjacent to, and outside of protected areas.

Status:
The researchers have conducted their first of two seasons of surveys. Approximately 7,000 lobsters were caught and tagged, and these preliminary results were presented to a newly formed Fisheries Data Review Committee as a means to broaden industry involvement in academic-fishermen collaboration. The preliminary data on lobster size and abundance was presented at the February 8, 2008 Channel Islands Symposium. Fish tagging was conducted using traps and stick fishing on all commercial vessels, with approximately 1,000 fish tagged over the season. Additional collaboration with two more commercial fishing vessels is being arranged for the spring and summer 2008 to overlap with PISCO dives in the same areas.

Icthyoplankton Surveys (OPC-DFG Workplan)
$500,000
Objectives:
The California Cooperative Oceanic Fisheries Investigation (CalCOFI) program and the University of California San Diego will describe ichthyoplankton assemblages found in recent and historical samples, develop stock and recruitment indices for the California spiny lobster,

examine these indices in relation to climate indices, and provide an integrated, publicly available CalCOFI database. Some data on stock size and/or recruitment and larval abundance for spiny lobster have been collected by CalCOFI but not systematically analyzed in relation to time series landings or climate variability. Given the economic importance of the commercial lobster fishery in the state, CalCOFI will assess historic and current nearshore ichthyoplankton communities and their relation to oceanographic conditions. This project will provide DFG and others with time series data that they can use to inform future spiny lobster management decisions.

Status:
The project is scheduled to begin in March 2008.

Recreational Fishing Field Data Collection (OPC-DFG Workplan)
$629,055
Objectives
The Pacific State Marine Fisheries Commission was hired to conduct three separate studies to examine and recommend improvements to different components of the California Recreational Fisheries Survey (CRFS). The three studies will: (1) develop recommendations for improved methods for collecting and estimating fishing effort for private and rental boats returning to private-access sites, (2) develop recommendations for improved methods for collecting and estimating catch and catch-per-unit-effort for private and rental boats returning to private-access sites, and (3) evaluate the efficiency of various gears used in the recreational spiny lobster fishery and gather essential fishery information on the recreational spiny lobster fishery.

Status
Sampling for the third study began when the lobster season opened in September 2007; a total of 1,247 interviews have been conducted. The other studies are schedule to begin this year.

OPC RESEARCH FUNDED THROUGH SEA GRANT

Assessing Changes in Life History Traits and Reproductive Function of California Sheephead Across its Range: Historical Comparisons and the Effects of Fishing
Jennifer Caselle, UC Santa Barbara; Christopher Lowe & Kelly Young, CSU Long Beach
$162,442
The average California sheephead is smaller than it once was; females are reaching sexual maturity earlier, and they are transforming into males younger, and at odd times in the year. (Sheephead are sequentially hermaphroditic; they are born female and turn into males later in life.) In this project, researchers are investigating why fish size and reproductive structure has changed. The leading theory is that selective pressure from fishing and/or pollutants, especially estrogenic compounds, are to blame. This proposal is motivated by needs of the State of California and the California Dept of Fish and Game (CDFG) to better manage this ecologically important species. All data and results will be made available to the CDFG for use in the CA sheephead stock assessment model. The results of this project will have a significant impact on new regulatory actions and management of this important commercial and ecological resource. These results will also make an impact on the ultimate end-users: the recreational and commercial fishermen.

Bi-national Studies Leading to Ecosystems-based Management Strategy for the Common Thresher Shark and Other Fishery Resources in the Southern California Bight
Jeffrey Graham, UC San Diego/Scripps Institution of Oceanography; Oscar Sosa-Nishizaki, Centro de Investigación Científica y de Educación Superior de Ensenada (CICESE); Suzanne Kohin, National Marine Fisheries Service
$181,096
Biologists recently established a “mini-observer" program for the drift gillnet thresher shark fishery in Ensenada, Mexico. The project is part of an effort to assess the bi-national impact of fishing on shark populations in the Southern California Bight (SCB). For sharks with native ranges beyond the waters of one nation, bi-national research of this kind is essential in establishing ecosystem-based shark management plans that can protect the long-term viability of these vulnerable species. The proposed research is designed to provide U.S. and Mexican fisheries managers with data regarding: 1) the catch rates of threshers and other sharks in the Mexican region of the SCB; 2) the utilization of Mexican waters as a nursery ground for threshers; and 3) essential habitat of juvenile threshers throughout the SCB. These data can then be used in the formulation of ecosystems-based, sustainable, bi-national plans for the management of sharks and other pelagic fishery resources. This research has potential benefit for both the economy and ecological health of the SCB region.

Spiny Lobster Movement, Habitat Use and Abundance in Southern California: Bottom-up and Top-down Interactions in Kelp and Seagrass Habitats
Kevin Hovel, San Diego State University; Christopher Lowe, CSU Long Beach
$169,412
Researchers continue to tag and acoustically track California spiny lobsters to better understand the animals’ movement patterns and benthic habitats (e.g., kelp forests, surf grass and eelgrass beds). These data are being used, among other things, to identify the animals’ home ranges and the influence of geological and biological features on their activity. In the first year of the project, biologists tagged 12 lobsters in San Diego and began SCUBA surveys to estimate lobster densities and community structures in different habitats. The primary users of the results are regulatory/management agencies such as the CDFG and the National Marine Fisheries Service, who require more information on processes influencing lobster abundance and survival, home range, and habitat use to appropriately design marine reserves and to conserve and restore essential fish habitat such as seagrass. This research provides information to the above agencies and the Navy and the Port of San Diego regarding the use of particular habitats by spiny lobsters, and in particular, the importance of San Diego Bay seagrass beds to the San Diego lobster population. These results will be shared with other lobster biologists and marine ecologists on how benthic predators interact with their environment, specifically how the presence and absence of particular sub-habitats influences the distribution of a major benthic predator, and how the presence and absence of a major benthic predator influences community structure.

Ecology and Trophic Interactions of Jumbo Squid (Dosidicus gigas) in the California Current Ecosystem
William F. Gilly, Hopkins Marine Station/Stanford University; John Field, NOAA Southwest Fisheries Science Center
$263,389

The research team will study the jumbo squid (*Dosidicus gigas*) and its potential role within the California Current ecosystem. *Dosidicus* has become an unusually persistent resident off Monterey. As a predator, the jumbo squid consumes large quantities of mesopelagic organisms, competing directly for an important food source for many seabirds, marine mammals, and commercially important fish. The adult jumbo squid is a food source for sharks, large fish and marine mammals. Juvenile squid are eaten by many pelagic fish and sea birds.

Despite the obvious ecological importance of jumbo squid, surprisingly little is known about the overall ecology of this organism. To learn more about these new residents, biologists leading this project will count squid larvae in plankton, analyze squid stomach contents and track squid movements and foraging behaviors using pop-up tags. The information will help explain why the squid have expanded their range and what their impact on fisheries might be. The study will result in a better understanding of the jumbo squid's role in the ecosystem and its impact on commercially important resources. It will also provide the groundwork needed to model the jumbo squid population, which will become important if a commercial or recreational squid fishery develops, as it has in other regions. Through the Tagging of Pacific Pelagics (TOPP) website, researchers will write a blog and provide field work updates during year one.

Tackling Ecological Complexity and Climate Change: Matches and Mismatches in the Seasonal Cycle of California's Marine Flora and Fauna
William J. Sydeman, Farallon Institute for Advanced Ecosystem Research; Steven J. Bograd, NOAA National Marine Fisheries Service
$349, 469
In recent years, rock fish, forage fish and seabirds have all experienced low reproductive success in California. These declines may be due to a collapse of krill, a major food source. Krill declines may be a result of changing oceanographic conditions and climate. Other organisms appear to have switched feeding patterns: California sea lions are traveling much further offshore to feed and blue whales (that also feed on krill) are less abundant in the region. Mismatches in predator-prey relationships (i.e., prey not being available or being available at a different time of year) can have severe impacts on marine food webs, ecosystem structure, and fisheries. This research team is investigating climate-induced changes in the marine food webs around the Farallon Islands and will examine how trophic interactions that regulate the productivity of top predators are changing due to global climate change. Scientists will analyze existing physical and biological data and conduct field studies to create a comprehensive dataset for the period from 1997 to 2007. These data will then be used to study linkages between ocean upwelling, ocean circulation and trophic level productivity (primary, zooplankton, rockfish, seabird and salmon). The findings will have direct application for ecosystem-based fisheries management. The investigators hope to produce a novel, mechanistic understanding of the seasonal cycle in northern California marine ecosystem dynamics, and how it has changed, or is changing, over time. Greater understanding of these interactions can ultimately lead to the application of climate-based considerations in resource management decisions, such as informing fishery management plan development.

This research will increase exposure of climate-ecosystem-trophic considerations to management and user communities as a strategic, long-term improvement in decision-making. Researchers will lead and/or contribute to a new product concept "Integrated Ecosystem Assessments". The

project findings will aid in the development of FMP and FEP which take environmental variability into account. The project will also be of significance to federal fisheries and wildlife managers, including the PFMC, NPFMC, USFWS-Farallon National Wildlife Refuge, and NOAA-NMFS. Eventually, this work could potentially feed into the meta-analyses being conducted by Intergovernmental Panel on Climate Change (IPCC).

Proteomics to Develop Relevant Phenotypic Biomarkers of Environmental Impacts in Wild Marine Fishes of Southern California
Kevin Kelley, Cal State University Long Beach
$79,380
Previous research has shown that endocrine-disrupting chemicals in the marine environment have caused physiological disruption, such as changes to reproduction, growth and survival in a variety of different species within the Southern California Bight, including flatfish, surfperch and sculpin. However, most studies to date that have monitored these types of impacts to fish have used a single or limited set of biomarkers (e.g., measurement of hormone level). The researchers will develop more powerful diagnostic tools using a protein expression profile, or "fingerprint," that will allow a relevant assessment of environmental effects in marine organisms. This information will help lead to better identification of pollutants and their impacts on marine species and ecosystems, which in turn can help state resource managers and regulators reduce the sources of contamination.